

RECLAMATION

Managing Water in the West

**2014 Colorado River Annual
Operating Plan
Colorado River Management Work Group
(CRMWG)
Final Consultation
September 5, 2013**



U.S. Department of the Interior
Bureau of Reclamation

2014 Colorado River AOP Final Consultation Meeting

- Welcome and Introductions – *Terry Fulp / Larry Walkoviak*
- Upper Basin Hydrology and Operations – *Katrina Grantz*
- Lower Basin Hydrology and Operations – *Dan Bunk*
- 2014 AOP Review Process – *Steve Hvinden / Dave Trueman*
- Review of Draft 2014 AOP – *CRMWG*
- Conclusion and Wrap-up

Upper Colorado River Basin

Hydrology and Operations

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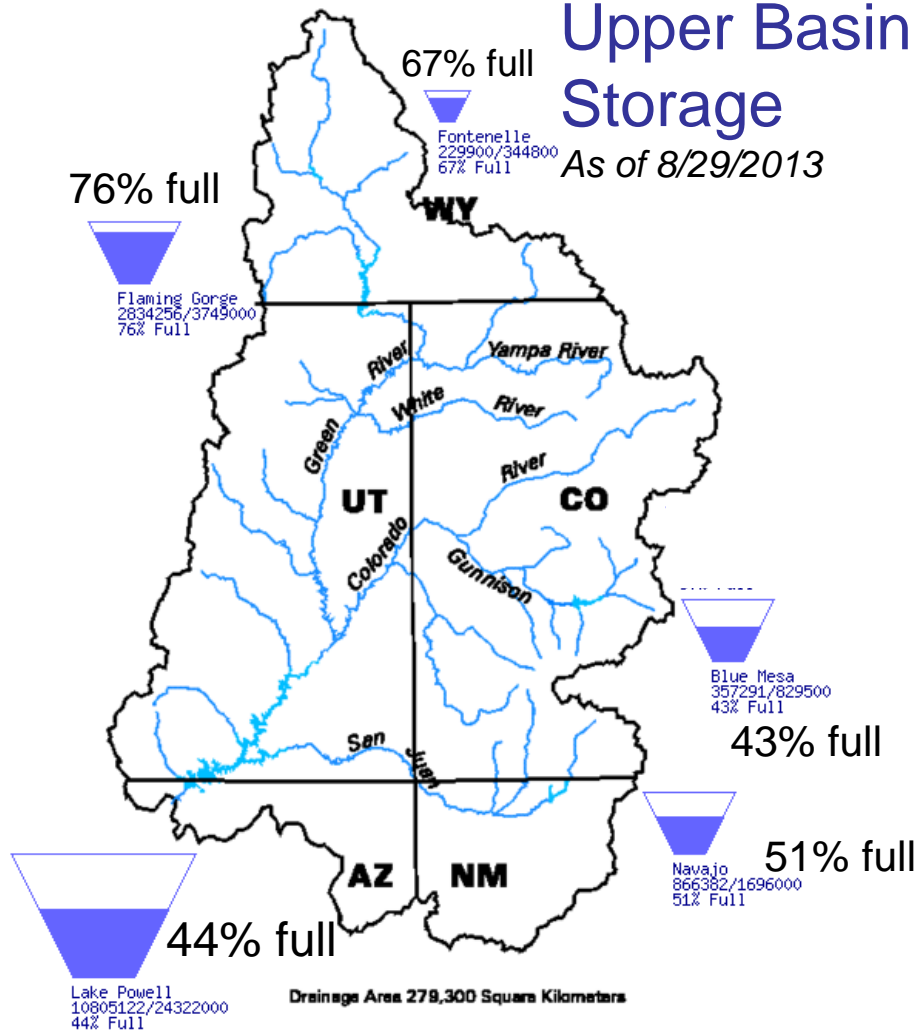
Upper Basin Current Status

Data Current as of:
08/29/2013

Upper Colorado River Drainage Basin

Upper Basin Storage

As of 8/29/2013



Water Year 2013

Projected Unregulated Inflow¹

Reservoir	Volume (kaf)	Percent of Average ²
Fontenelle	551	44
Flaming Gorge	621	43
Blue Mesa	519	54
Navajo	384	36
Powell	4328	40

¹ Based on CBRFC forecast issued August 1, 2013

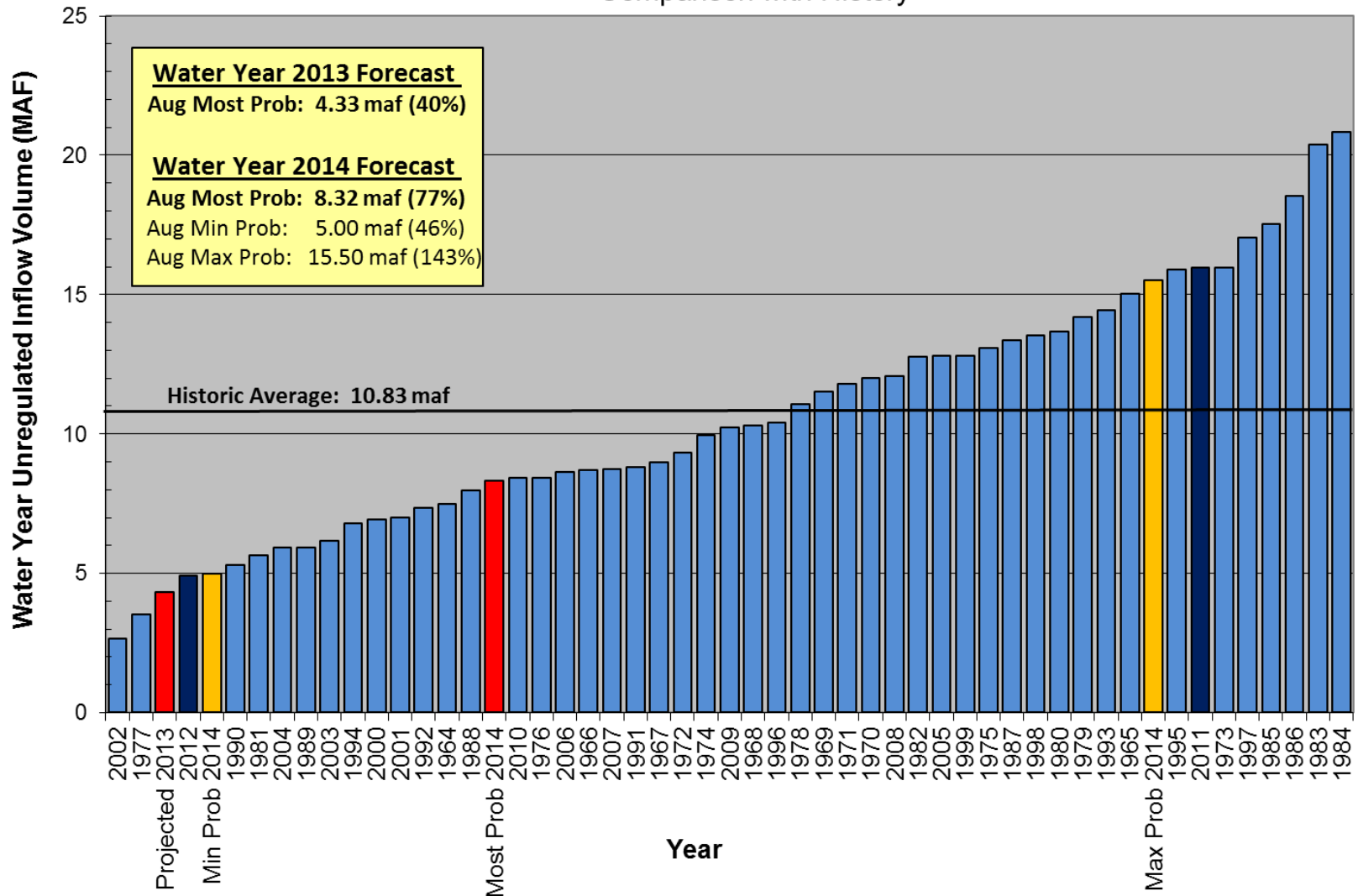
² Percentages and percent of average based on period of record from 1981-2010.

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Lake Powell Unregulated Inflow

Water Years 2013 and 2014 Forecast (issued August 1)

Comparison with History



2013 Annual Operating Plan (retrospective)

Lake Powell Unregulated Inflow Projections WY2013

Scenario	2013 AOP WY 2013 Developed August 2012	Most Probable WY 2013 Developed August 2013
Minimum Probable	5.00 maf (46 %) ¹	4.33 maf (40 %)
Most Probable	8.85 maf (82 %)	
Maximum Probable	16.00 maf (148 %)	

¹ Percentages and percent of average based on period of record from 1981-2010.

Lake Powell Unregulated Inflow Scenarios

As presented in Annual Operating Plan

Scenario	2013 AOP	2014 AOP
	WY 2013 Developed August 2012	WY 2014 Developed August 2013
Minimum Probable	5.00 maf (46 %*)	5.00 maf (46 %)
Most Probable	8.85 maf (82 %)	8.32 maf (77 %)
Maximum Probable	16.00 maf (148 %)	15.50 maf (143 %)

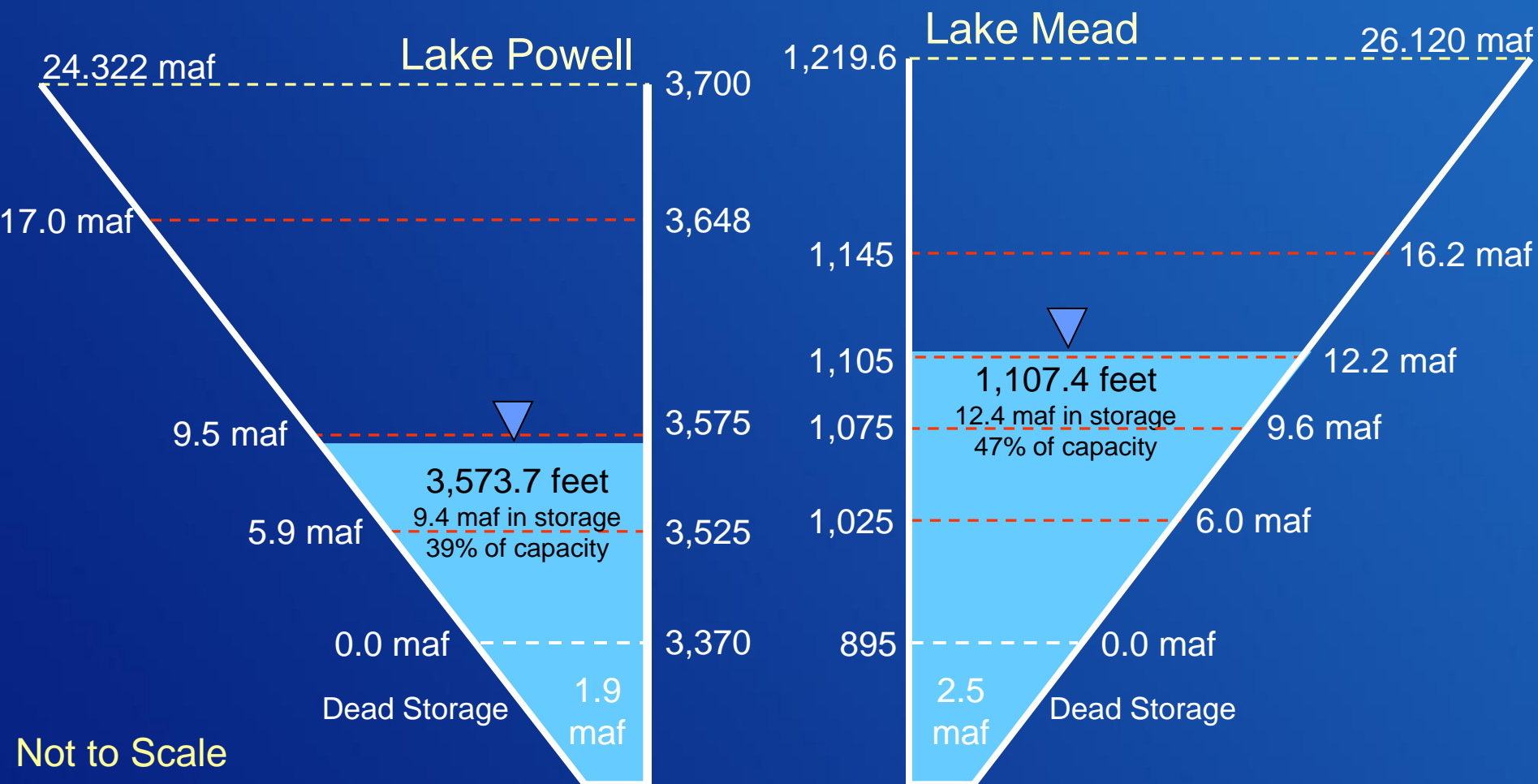
* Percent of average water year unregulated inflow 1981-2012 (10.83 maf)

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End of Calendar Year 2013 Projections

Powell Operating Tier Determination Run for Water Year 2014¹

Based on an 8.23 maf release pattern from Lake Powell in Water Year 2014



¹ WY 2014 unregulated inflow into Lake Powell is based on the CBRFC outlook dated 8/1/13.

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Lake Powell Operational Table

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)		15.5 - 19.3 (2008-2026)	1,200 (approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
	Upper Elevation Balancing Tier³ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf		1,145		15.9
3,575		9.5	1,105	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	11.9
3,525	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	5.9	1,075	Shortage Condition Deliver 7.167 ⁴ maf	9.4
			1,050		7.5
3,490	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,025	Shortage Condition Deliver 7.083 ⁵ maf	5.8
3,370		0	1,000	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷	4.3
			895		0

Diagram not to scale

¹ Acronym for million acre-feet

² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

³ Subject to April adjustments which may result in a release according to the Equalization Tier

⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

⁵ Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

⁶ Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

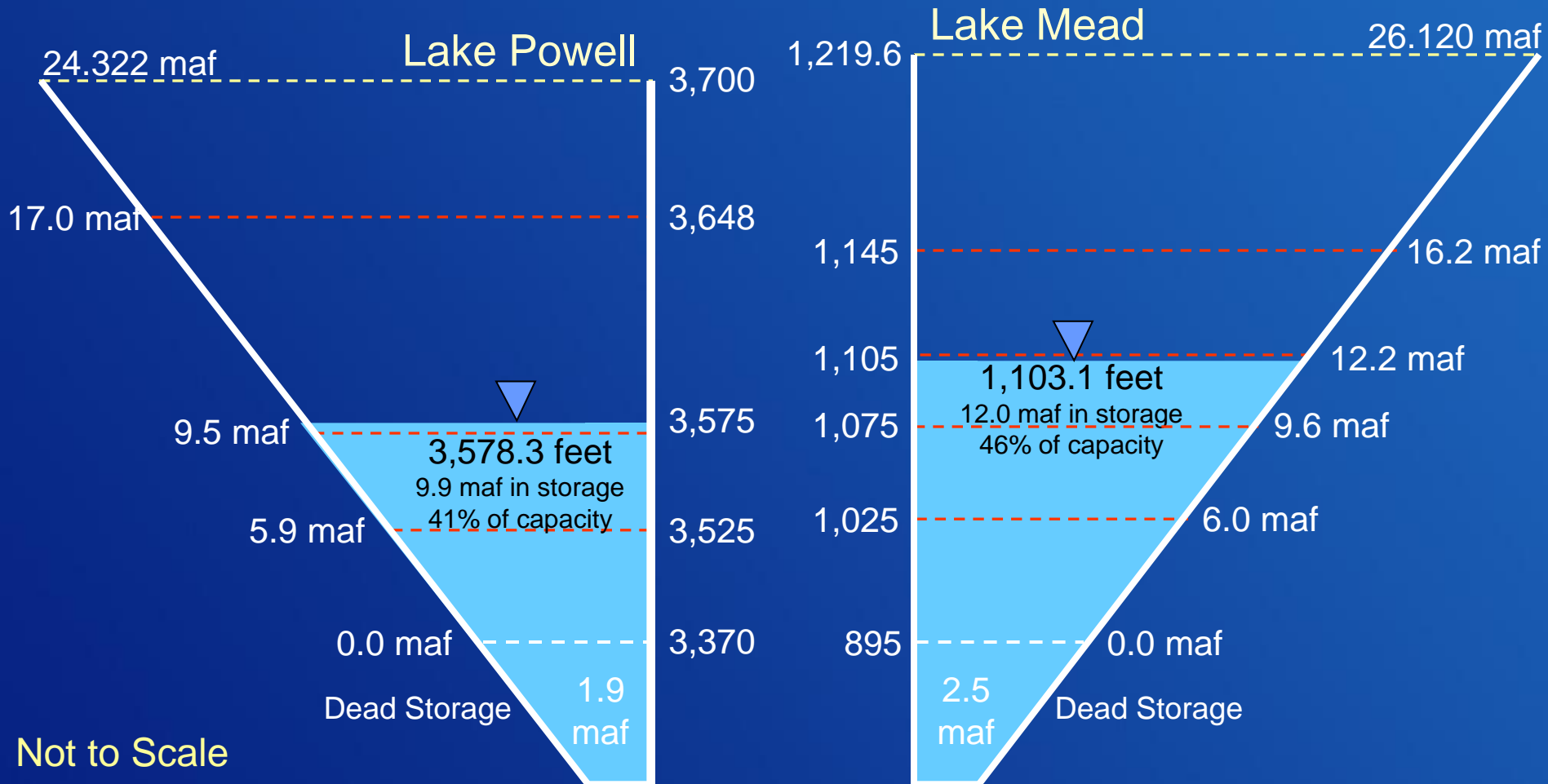
⁷ Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

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End of Calendar Year 2013 Projections

August 2013 24-Month Study Most Probable Inflow Scenario¹

Based on a 7.48 maf release pattern from Lake Powell in Water Year 2014



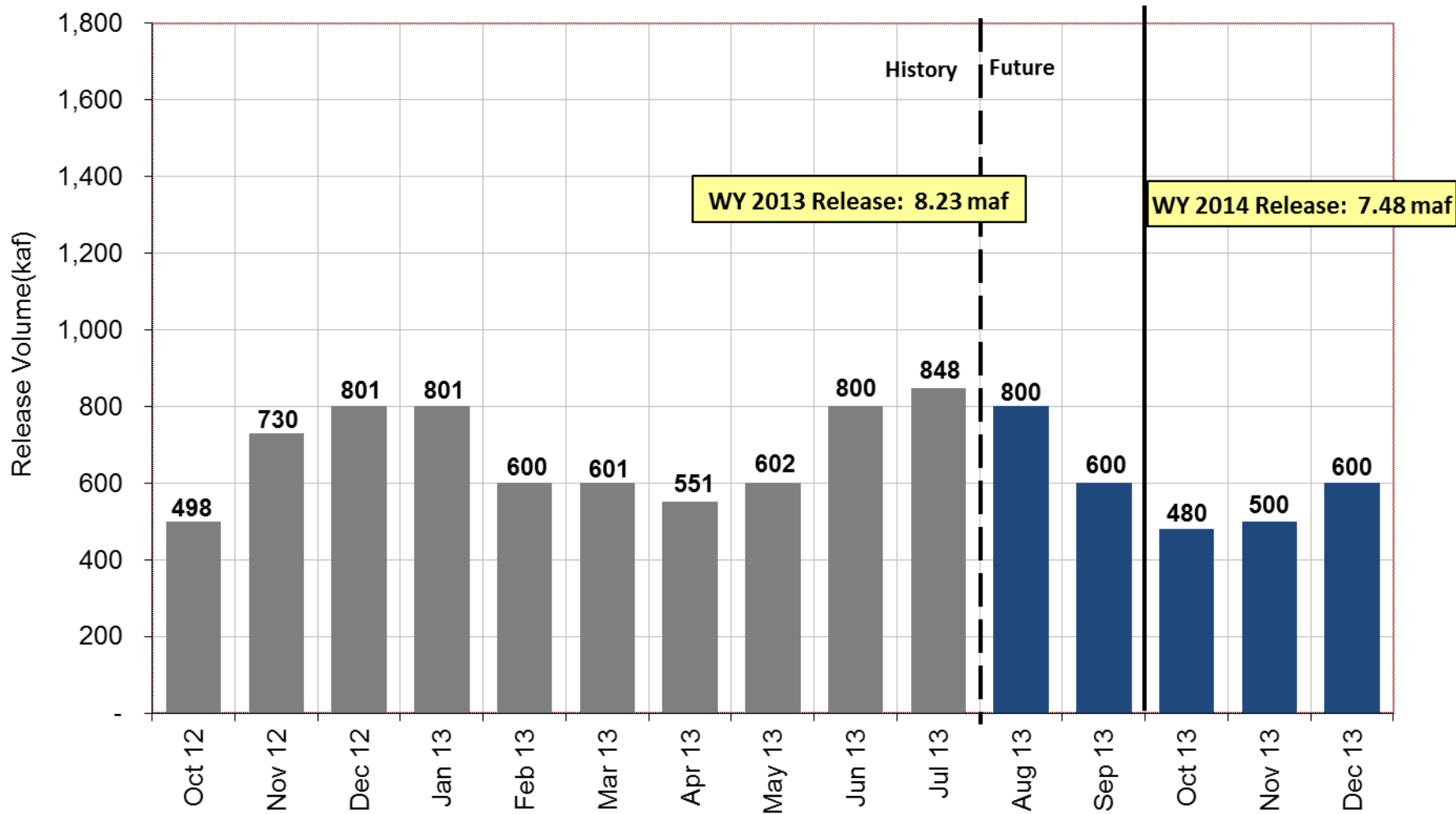
¹ WY 2014 unregulated inflow into Lake Powell is based on the CBRFC outlook dated 8/1/13.

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Lake Powell Monthly Release Volume Distribution

August 2013 24-Month Study

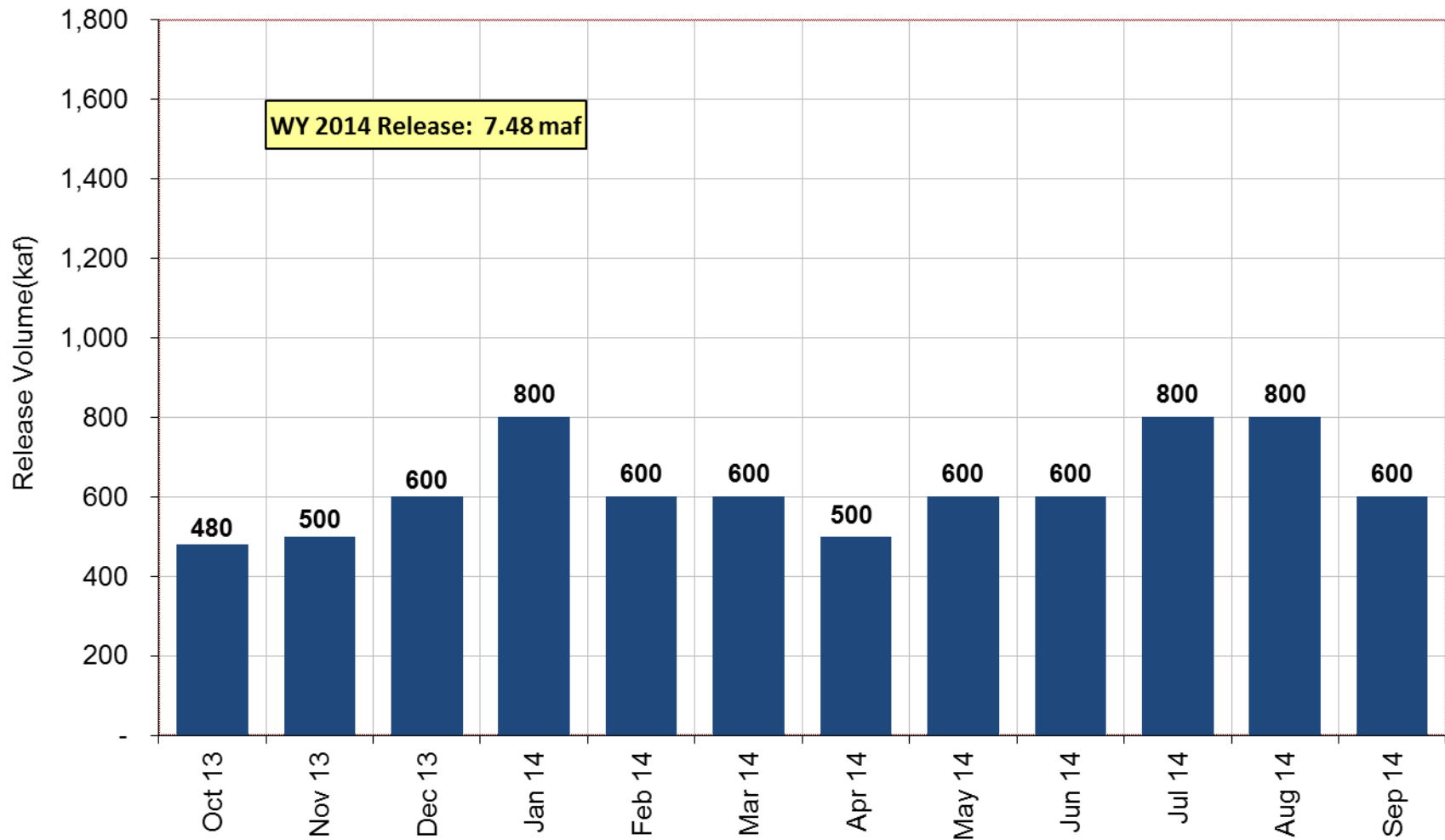
Water Year 2013



Projected Lake Powell Monthly Release Volume Distribution

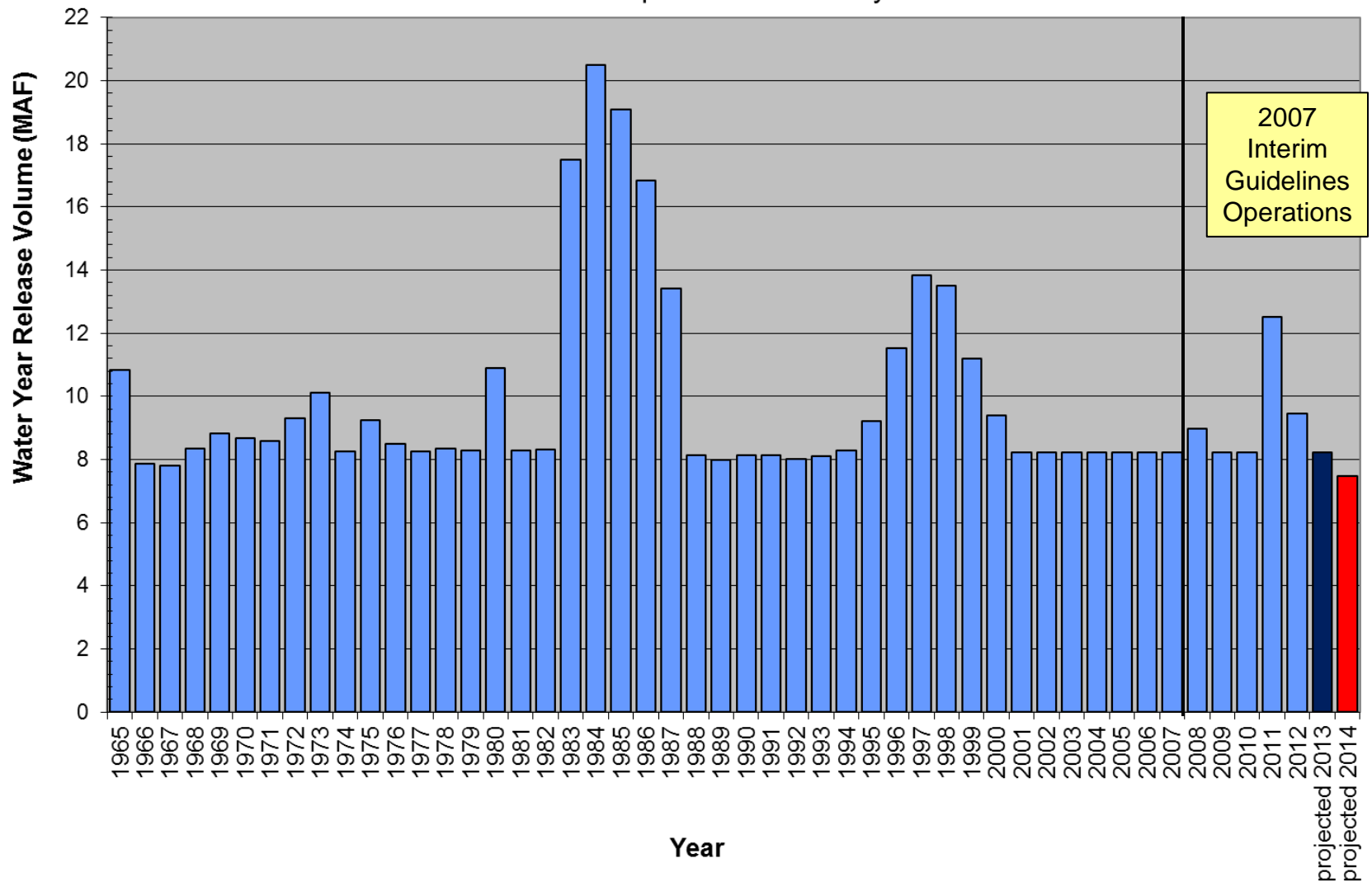
August 2013 24-Month Study

Water Year 2014



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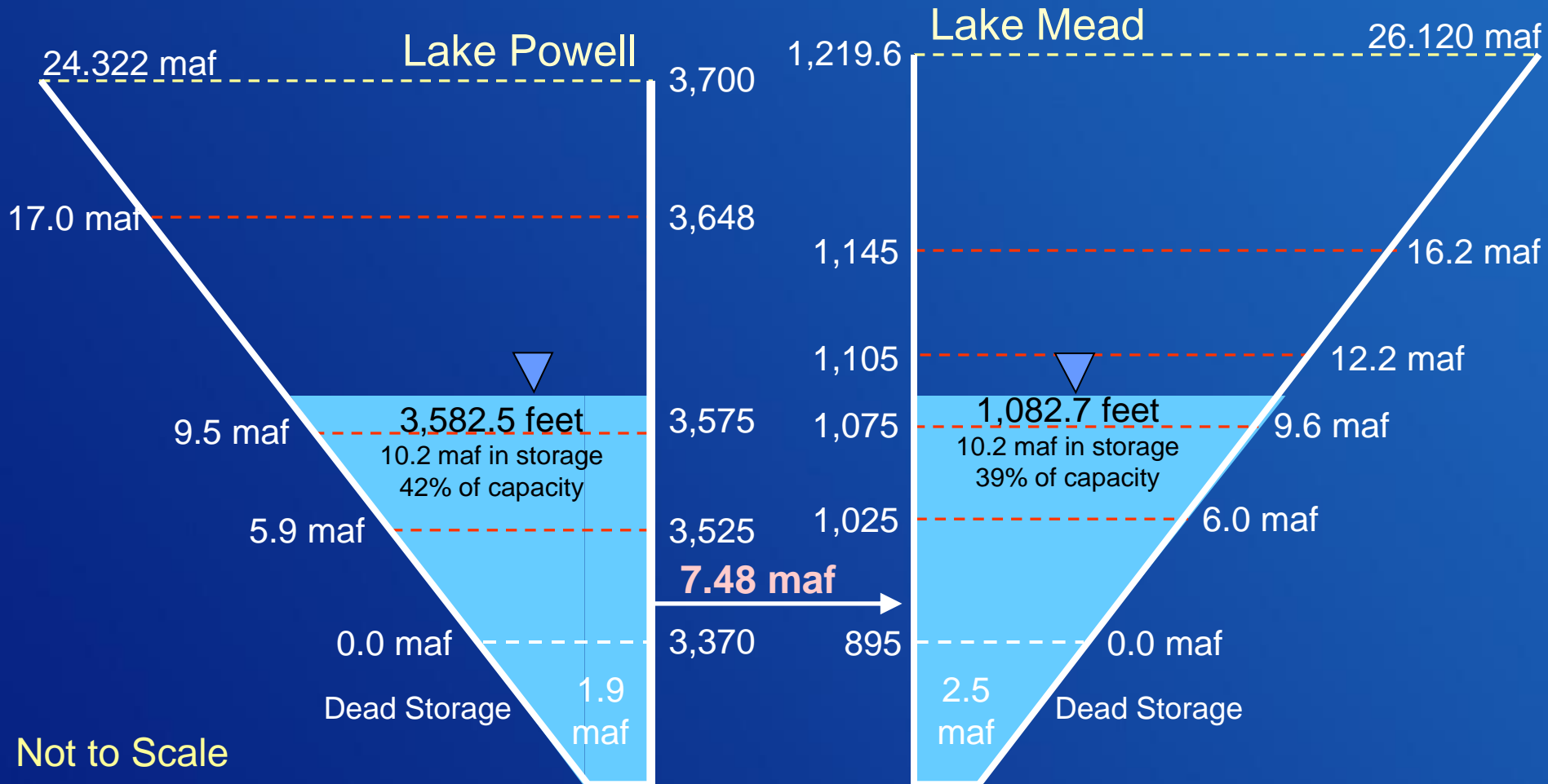
Lake Powell Release Water Year 2013 and 2014 Projected Comparison with History



End of Water Year 2014 Projections

August 2013 24-Month Study Most Probable Inflow Scenario¹

Based on a 7.48 maf release pattern from Lake Powell in Water Year 2014

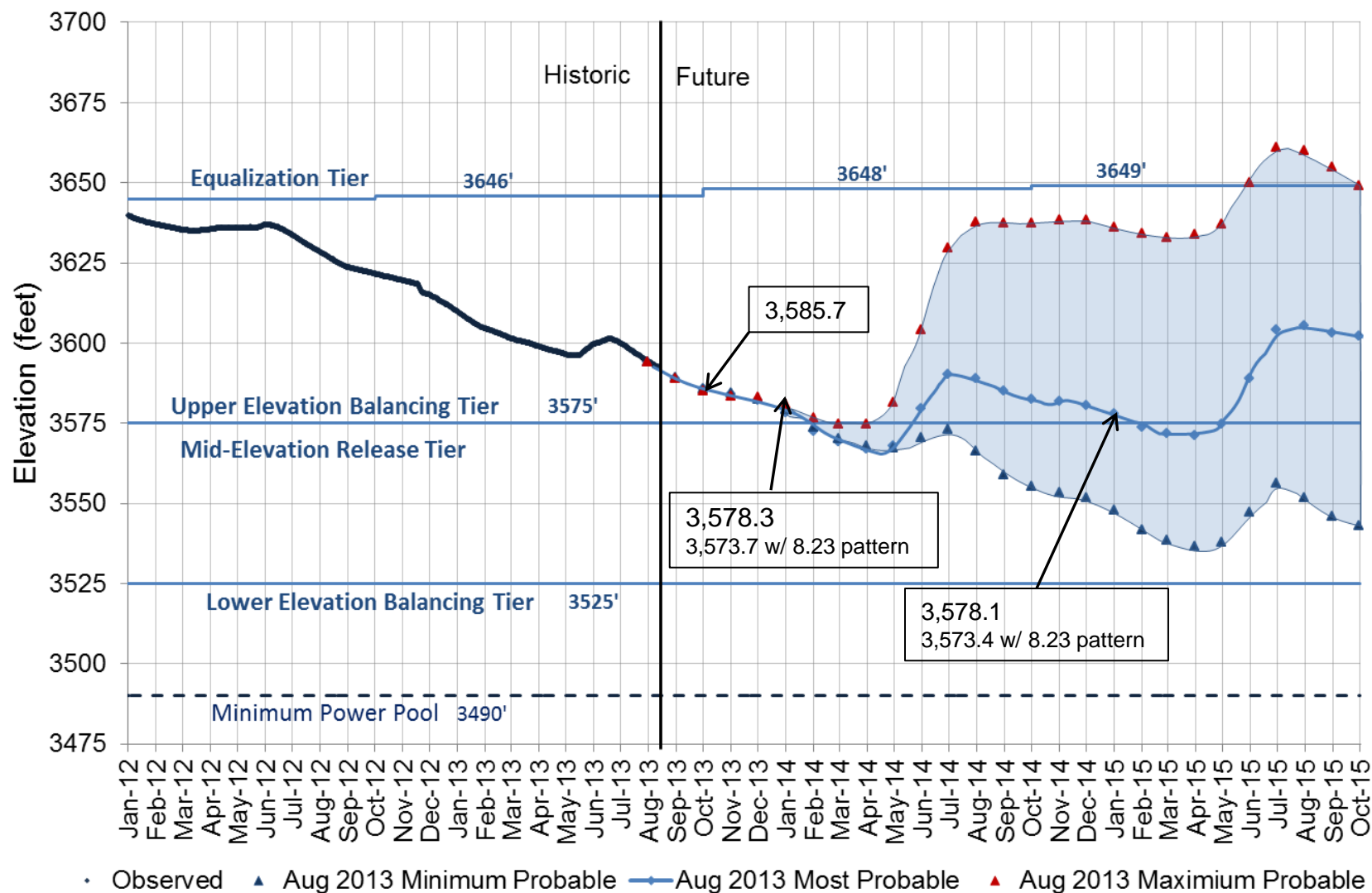


¹ WY 2014 unregulated inflow into Lake Powell is based on the CBRFC outlook dated 8/1/13.

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Lake Powell Elevations

Historic and Projected based on August modeling



Projected Lake Powell Operational Tiers

Based on August 2013 24-Month Study Inflow Scenarios

Powell Inflow Scenario	WY 2014 Jan 1, 2014 Projection	WY 2015 Jan 1, 2015 Projections
Probable Minimum	Mid-Elevation Release Tier Elevation 3573.69 ft 7.48 maf release	Mid-Elevation Release Tier Elevation 3548.01 ft 7.48 maf release
Most Probable		Mid-Elevation Release Tier Elevation 3573.42 ft 7.48 maf release
Probable Maximum		Upper Elevation Balancing Tier w/ Projected April shift to Equalization Elevation 3636.30 ft 11.86 maf release

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Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2013

Unit Number	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013
1												
2												
3												
4												
5												
6												
7												
8												
Units Available	5	8 7	7	7	5	5 6	6	5	6	6	6	5
Capacity (cfs)	19,500	25,200 21,700	21,800	21,600	14,800	14,900 18,600	18,600	14,700	18,000	17,900	17,900	15,200
Capacity (kaf/month)	1310	1380	1290	1290	920	1090	1110	980	1070	1110	1110	910
Max (kaf) ¹	--	--	--	--	--	--	--	--	--	--	--	600
Most (kaf) ¹	494	730	801	801	600	600	551	602	800	847	801	600
Min (kaf) ¹	--	--	--	--	--	--	--	--	--	--	--	600

¹ Based on Aug 2013 Min/Most/Max probable 24-Month Study

(maintenance updated 8-7-2013)

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Glen Canyon Power Plant Provisional Unit Outage Schedule for Water Year 2014

Unit Number	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014
1												
2												
3												
4												
5												
6												
7												
8												
Units Available	5	6	6	6	4	5 6	6	5 6	6	6	6	5
Capacity (cfs)	15,100	17,800 ²	17,800	17,800	12,800	14,300 17,800	17,800	14,300 17,800	17,800	17,900	17,900	14,600
Capacity (kaf/month)	930	1060	1100	1100	710	1000	1040	990	1080	1100	1100	890
Max (kaf) ¹	480	500	600	800	600	600	500	600	600	800	800	600
Most (kaf) ¹	480	500	600	800	600	600	500	600	600	800	800	600
Min (kaf) ¹	480	500	600	800	600	600	500	600	600	800	800	600

(maintenance updated 8-7-2013)

1 Based on Aug 2013 Min/MostMax probable 24-Month Study

2 Total release during a HFE = Capacity +15,000 cfs bypass

(e.g., Nov 2013 Total Possible Release = ~32,800 cfs)

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Lower Colorado River Basin

Hydrology and Operations

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Lake Powell & Lake Mead Operational Table

Operational Tier Determinations for Water Year/Calendar Year 2014

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	Upper Elevation Balancing Tier³ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.5 - 19.3 (2008-2026)	1,200 (approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
			1,145		15.9
3,575			1,105	1,103.08 Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	11.9
	1/1/14 Projection¹	9.5			
	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	5.9	1,075	1/1/14 Projection Shortage Condition Deliver 7.167 ⁴ maf	9.4
3,525			1,050		7.5
	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf		1,025	Shortage Condition Deliver 7.083 ⁵ maf	5.8
3,490		4.0	1,000	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷	4.3
3,370		0	895		0

Diagram not to scale

¹ Acronym for million acre-feet

² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

³ Subject to April adjustments which may result in a release according to the Equalization Tier

⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

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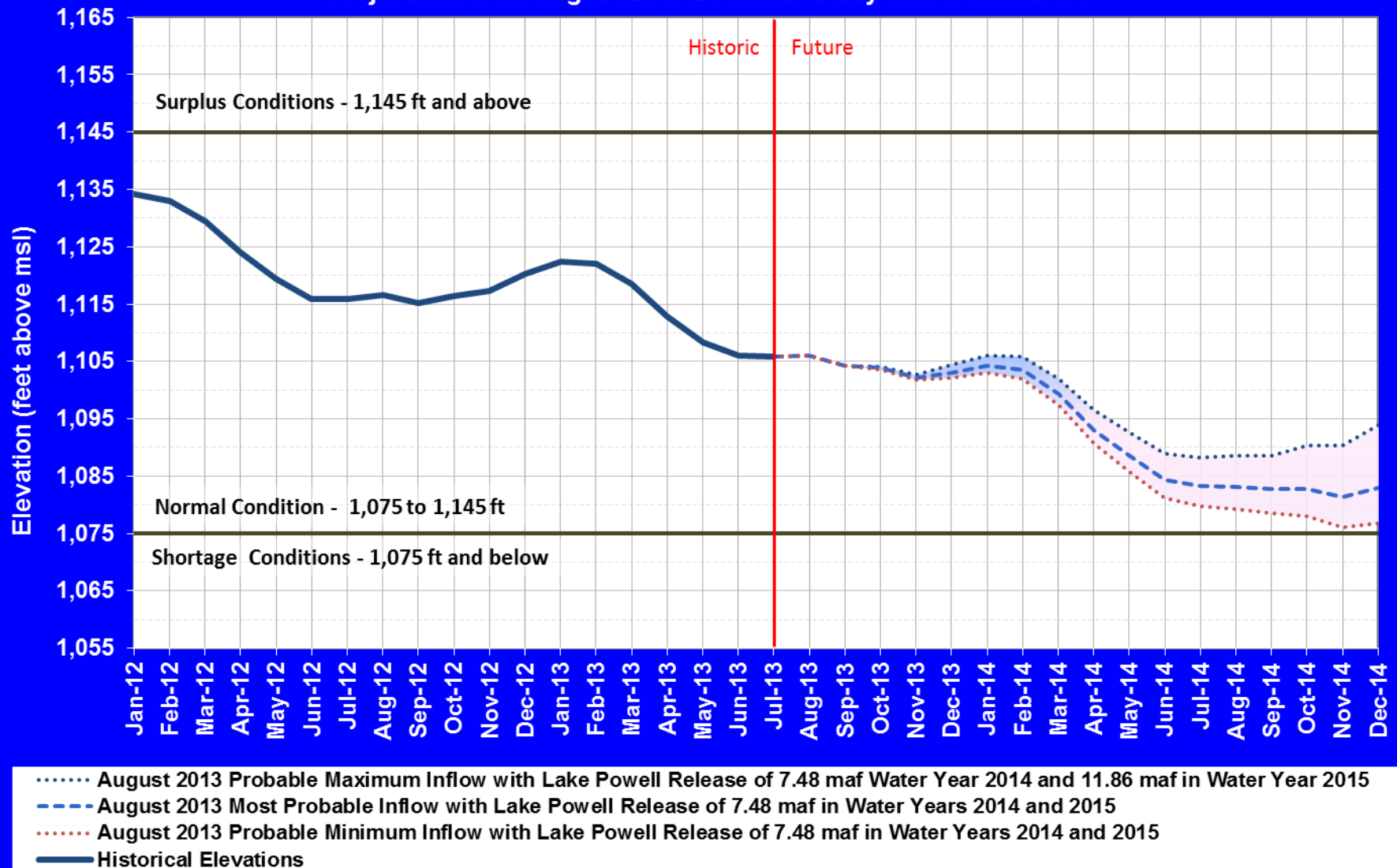
⁷ Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

¹ Lake Powell's projected elevation is based on an 8.23 maf annual release pattern from in water year 2014.

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Lake Mead End of Month Elevations

Projections from August 2013 24-Month Study Inflow Scenarios



Projected Lake Mead Operational Tiers

Based on August 2013 24-Month Study Inflow Scenarios

Powell Inflow Scenario	CY 2014 Jan 1, 2014 Projection	CY 2015 Jan 1, 2015 Projections
Probable Minimum	Normal - ICS Surplus Condition Elevation 1,103.08 ft	Normal - ICS Surplus Condition Elevation 1,076.76 ft
Most Probable		Normal - ICS Surplus Condition Elevation 1,082.98 ft
Probable Maximum		Normal - ICS Surplus Condition Elevation 1,093.94 ft

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Lower Basin Side Inflows – WY/CY 2013^{1,2}

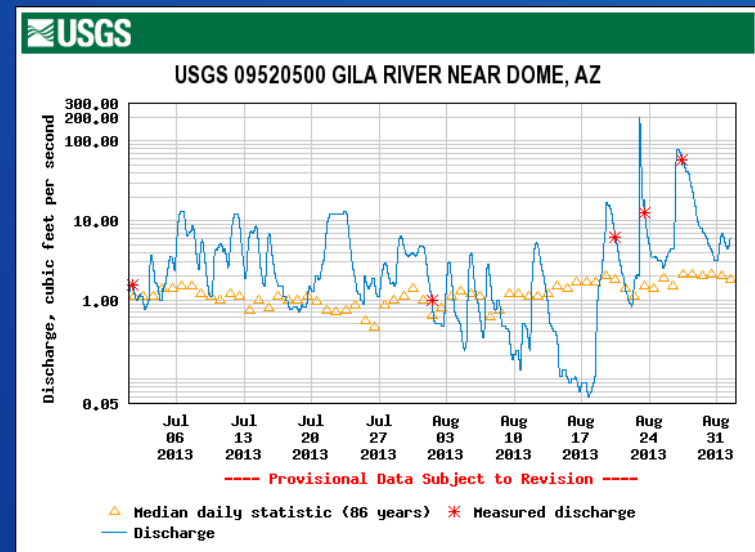
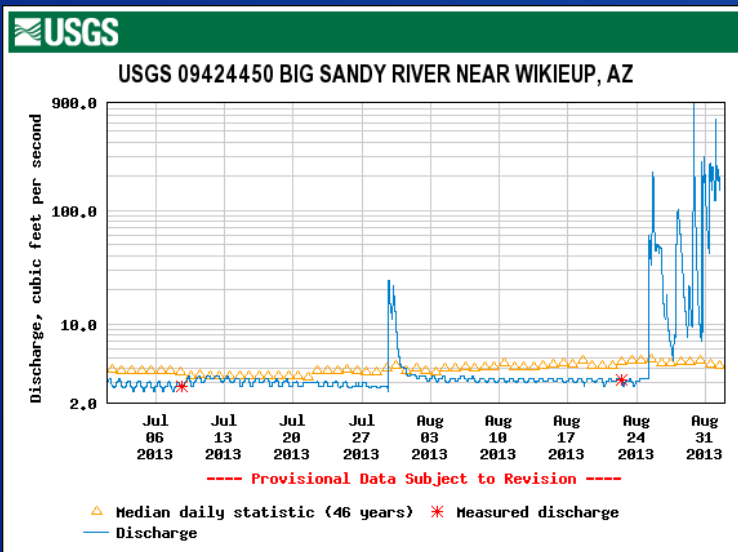
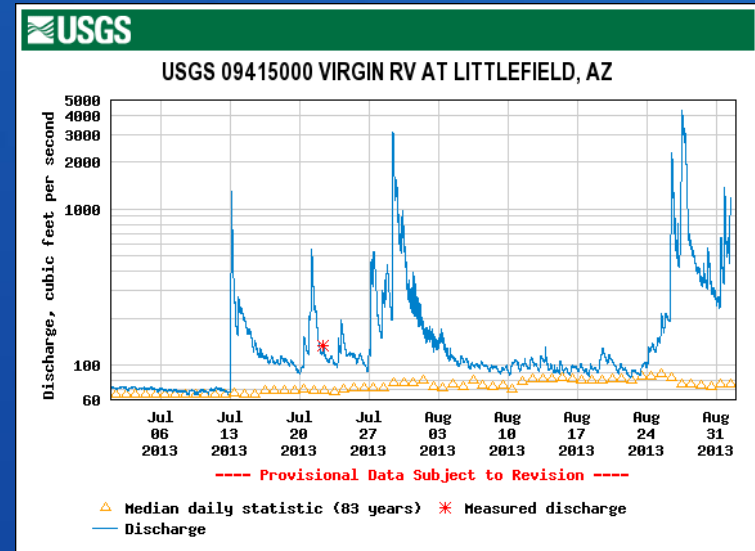
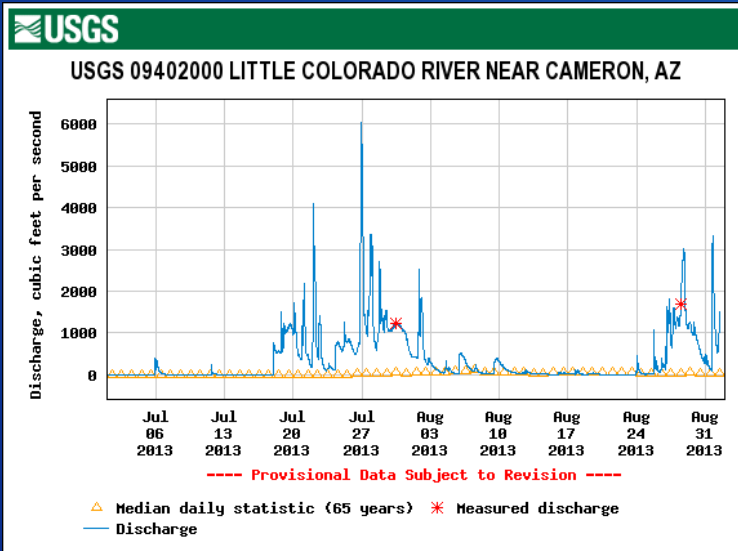
Intervening Flow from Glen Canyon to Hoover Dam

Month in WY/CY2013		5-Year Average Intervening Flow (KAF)	Observed Intervening Flow (KAF)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (KAF)
H I S T O R Y	October 2012	54	53	98%	-1
	November 2012	44	60	136%	+16
	December 2012	99	50	50%	-49
	January 2013	81	56	69%	-25
	February 2013	94	68	73%	-26
	March 2013	77	69	89%	-8
	April 2013	80	37	46%	-43
	May 2013	64	28	44%	-36
	June 2013	33	1	3%	-32
	July 2013	55	115	211%	+60
	August 2013	109	127	117%	+18
F U T U R E	September 2013	81			
	October 2013	54			
	November 2013	44			
	December 2013	99			
WY 2013 Totals		870	745	86%	-125
CY 2013 Totals		870	779	90%	-91

¹ Values were computed with the LC's gain-loss model for the most recent 24-month study.

² Percents of average are based on the 5-year mean from 2008-2012.

Lower Basin Inflows - July/August 2013



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Lower Basin Inflows - July/August 2013



Flooding in Las Vegas Valley
--Photos courtesy of KLAS, Las Vegas

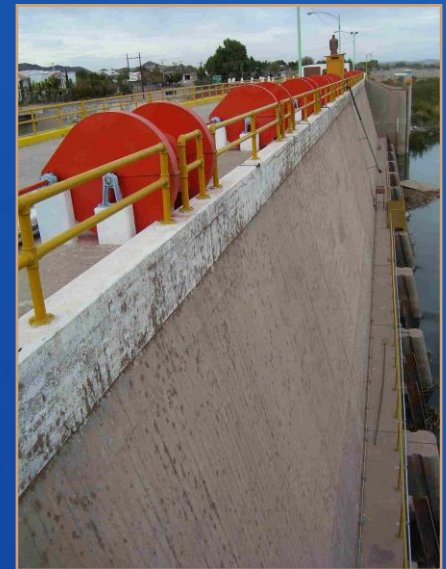


Colorado River near Piute Wash (mile 253) in Yuma
--LCR photos by Jeff L. Sanderson

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YAO Operations Update

- Brock and Senator Wash storage year-to-date¹
 - Brock 90,600 AF
 - Senator Wash 63,070 AF
- Excess Flows to Mexico year-to-date² 46,570 AF



¹ Provisional values through August 31, 2013

² Provisional value through September 2, 2013

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- Conclusion and Wrap-up

An aerial photograph of a large concrete dam with a curved crest, situated in a deep, arid canyon. The reservoir behind the dam is a vibrant blue-green color. Several spillways with cylindrical structures are visible on the right side of the dam. The surrounding landscape is rugged and brown, with steep cliffs and winding roads. The text is overlaid in white on the upper portion of the image.

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